PROPOSAL FOR
NO FURTHER ACTION
Environmental Restoration Project

Site 152, Building 9950 Septic System
Operable Unit 1295
January 1997

Prepared by
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Albuquerque, New Mexico

Prepared for the
Department of Energy

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1.0 INTRODUCTION

1.1 ER Site 152, Building 9950 Septic System

Sandia National Laboratories/New Mexico (SNL/NM) is proposing a no further action (NFA) decision based on confirmatory sampling for Environmental Restoration (ER) Site 152, Building 9950 Septic System, Operable Unit (OU) 1295. ER Site 152 is listed in the Hazardous and Solid Waste Amendments (HSWA) Module IV (EPA August 1993) of the SNL/NM Resource Conservation and Recovery Act (RCRA) Hazardous Waste Management Facility Permit (NM5890110518-1) (EPA August 1992).

1.2 SNL/NM Administrative NFA Process

This proposal for a determination of an NFA decision based on confirmatory sampling was prepared using the process presented in Section 4.5.3 of the SNL/NM Program Implementation Plan (SNL/NM February 1995). It follows guidance documented in Title 40, Code of Federal Regulations (CFR), Part 264.514(a) (2) that states NFAs "must contain information demonstrating that there are no releases of hazardous waste (including hazardous constituents) from solid waste management units (SWMU) at the facility that may pose a threat to human health or the environment" (EPA July 1990). The HSWA Module IV contains the same requirements for an NFA demonstration:

> "Based on the results of the RFI [RCRA Facility Investigation] and other relevant information, the Permittee may submit an application to the Administrative Authority for a Class III permit modification under 40 CFR 270.42(c) to terminate the RFI/CMS [corrective measures study] process for a specific unit. This permit modification application must contain information demonstrating that there are no releases of hazardous waste including hazardous constituents from a particular SWMU at the facility that pose threats to human health and/or the environment, as well as additional information required in 40 CFR 270.42(c)." (EPA August 1993).

If the available archival evidence is not considered convincing, SNL/NM performs confirmatory sampling to increase the weight of the evidence and allow an informed decision on whether to proceed with the administrative-type NFA or to return to the site characterization program for additional data collection (SNL/NM February 1995).

The Environmental Protection Agency (EPA) acknowledged that the extent of sampling required may vary greatly, stating that:

> ". . . the agency does not intend this rule [the second codification of HSWA] to require extensive sampling and monitoring at every SWMU. . . . Sampling is generally required only in situations where there is insufficient evidence on which to make an initial release determination. . . . The actual extent of sampling will vary . . . depending on the amount and quality of existing information available." (EPA December 1987).

This request for an NFA decision for ER Site 152 is based primarily on analytical results of confirmatory soil samples collected at the site. Concentrations of site-specific constituents of concern (COC) detected in the soil samples were first compared to background 95th percentile or upper tolerance limit (UTL) concentrations of COCs found in SNL/NM soils (IT March 1996) or other relevant background limits. If no SNL/NM background limit was available for a particular COC, or if the COC concentration exceeded the SNL/NM or other relevant background limit, then the constituent concentration was compared to the proposed 40 CFR Part 264 Subpart S (Subpart S) or other relevant soil action level for the compound (EPA July 1990).

A site is eligible for an NFA proposal if it meets one or more of the following criteria presented in the Environmental Restoration Document of Understanding (NMED November 1995):

- NFA Criterion 1: The site cannot be located or has been found not to exist, is a duplicate potential release site (PRS), or is located within and therefore investigated as part of another PRS.

- NFA Criterion 2: The site has never been used for the management (that is, generation, treatment, storage, or disposal) of RCRA solid or hazardous wastes and/or constituents or other Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances.

- NFA Criterion 3: No release to the environment has occurred, nor is likely to occur in the future.

- NFA Criterion 4: There was a release, but the site was characterized and/or remediated under another authority which adequately addresses corrective action, and documentation, such as a closure letter, is available.

- NFA Criterion 5: The PRS has been characterized or remediated in accordance with current applicable state or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use.

Review and analysis of the ER Site 152 soil sample analytical data indicate that concentrations of COCs detected in soils at this site are less than (1) SNL/NM or other applicable background concentrations, or (2) proposed Subpart S or other action levels. Thus ER Site 152 is being proposed for an NFA decision based on confirmatory sampling data demonstrating that hazardous waste or COCs that may have been released from this SWMU into the environment pose an acceptable level of risk under current and projected future land use (Criterion 5).

1.3 Local Setting

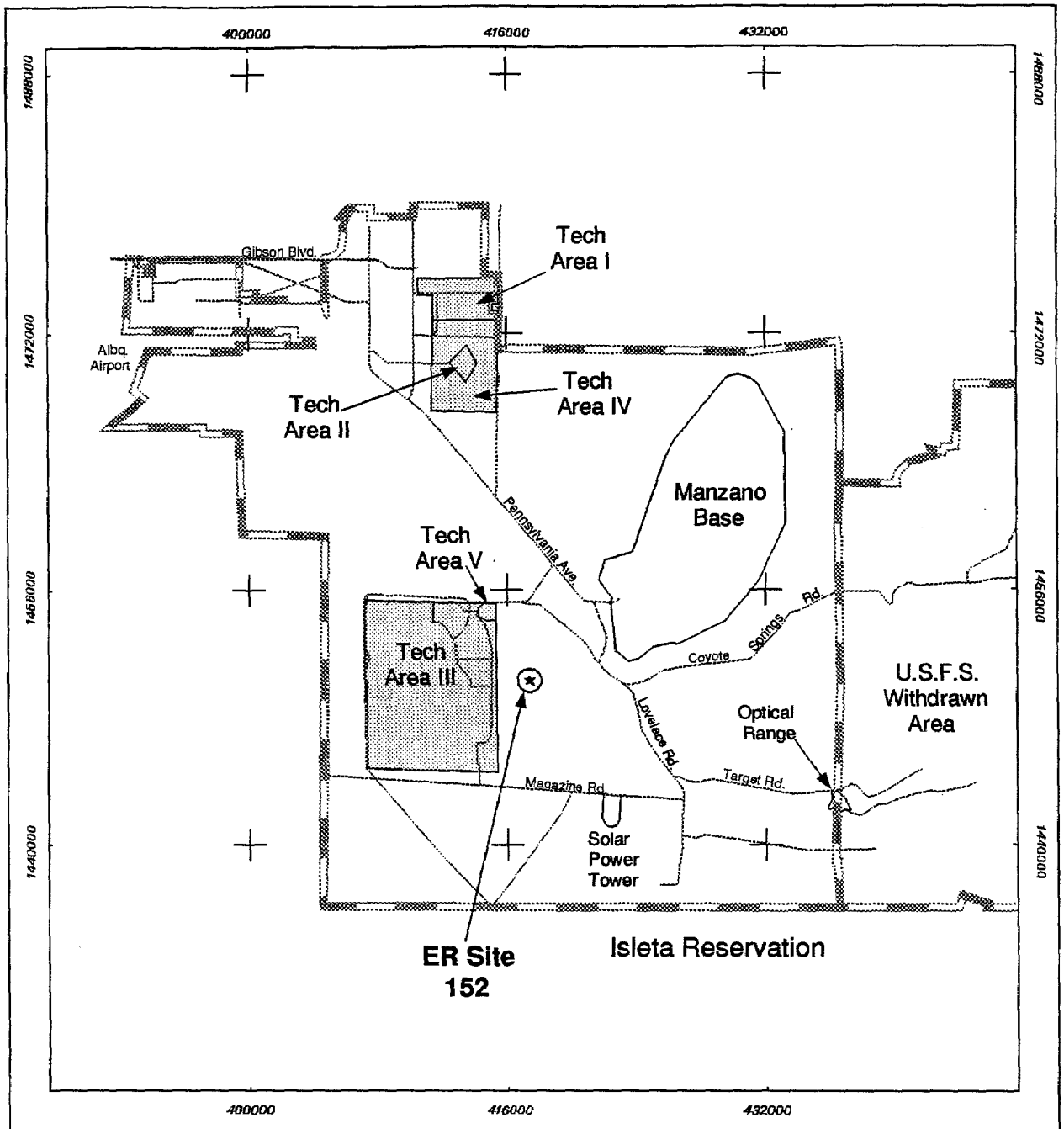
SNL/NM occupies 2,829 acres of land owned by the Department of Energy (DOE), with an additional 14,920 acres of land provided by land-use permits with Kirtland Air Force Base (KAFB), the United States Forest Service, the State of New Mexico, and the Isleta Indian Reservation.

SNL/NM has been involved in nuclear weapons research, component development, assembly, testing, and other research and development activities since 1945 (DOE September 1987).

ER Site 152 is located on KAFB, and is approximately 0.3 miles east of Technical Area III (TA III). Access to the site is provided by paved and graded dirt roads that extend approximately 1.1 miles from the turn-off to TA III from Lovelace Road (Figure 1-1). ER Site 152 includes the area around the drainfield serving a 750-gallon septic tank west of Building 9950 (Figure 1-2). The drainfield consists of four PVC drain lines 25 feet in length (SNL/NM August 1994). The site encompasses approximately 0.08 acres of flat-lying land at an elevation of 5,485 feet above mean sea level (amsl).

The surficial geology at ER Site 152 is characterized by alluvial fan deposits (SNL/NM March 1996a). These heterogeneous deposits contain poorly sorted, laterally and vertically discontinuous sand, silt, and gravel beds. Based on drilling records of similar deposits at KAFB, the alluvial fan materials are highly heterogeneous, and are composed primarily of medium to fine silty sands with frequent coarse sand, gravel, and cobble lenses. The alluvial fan deposits probably extend to the water-table. Vegetation consists predominantly of grasses including grama, muhly, dropseed, and galleta. Shrubs commonly associated with the grasslands include sand sage, winter fat, saltbrush, and rabbitbush. Cacti are common, and include cholla, pincushion, strawberry, and prickly pear (SNL/NM March 1993).

The water-table elevation is approximately 4,950 feet amsl at this location, so depth to groundwater is approximately 535 feet. Local groundwater flow is believed to be in a generally west to northwest direction in the vicinity of this site (SNL/NM March 1996a). The nearest production wells are northwest of the site and include KAFB-1, 2, 4, 7, and 14, which are approximately 4 to 5 miles away. The nearest groundwater monitoring wells to the site are the group of wells installed around the Chemical Waste Landfill in the southeast corner of TA III and MWL-BW1 in the Mixed Waste Landfill in the center of TA III. These wells are located, respectively, approximately 1 mile southwest and northwest of ER Site 152 (SNL/NM August 1996).



Legend

- ER Site 152
- Major Roads
- KAFB Boundary
- Technical Areas

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1927 North American Horizontal Datum, 1929 North American Vertical Datum

DRAFT
Unclassified
1:120000

0 5000 10000
Scale in Feet

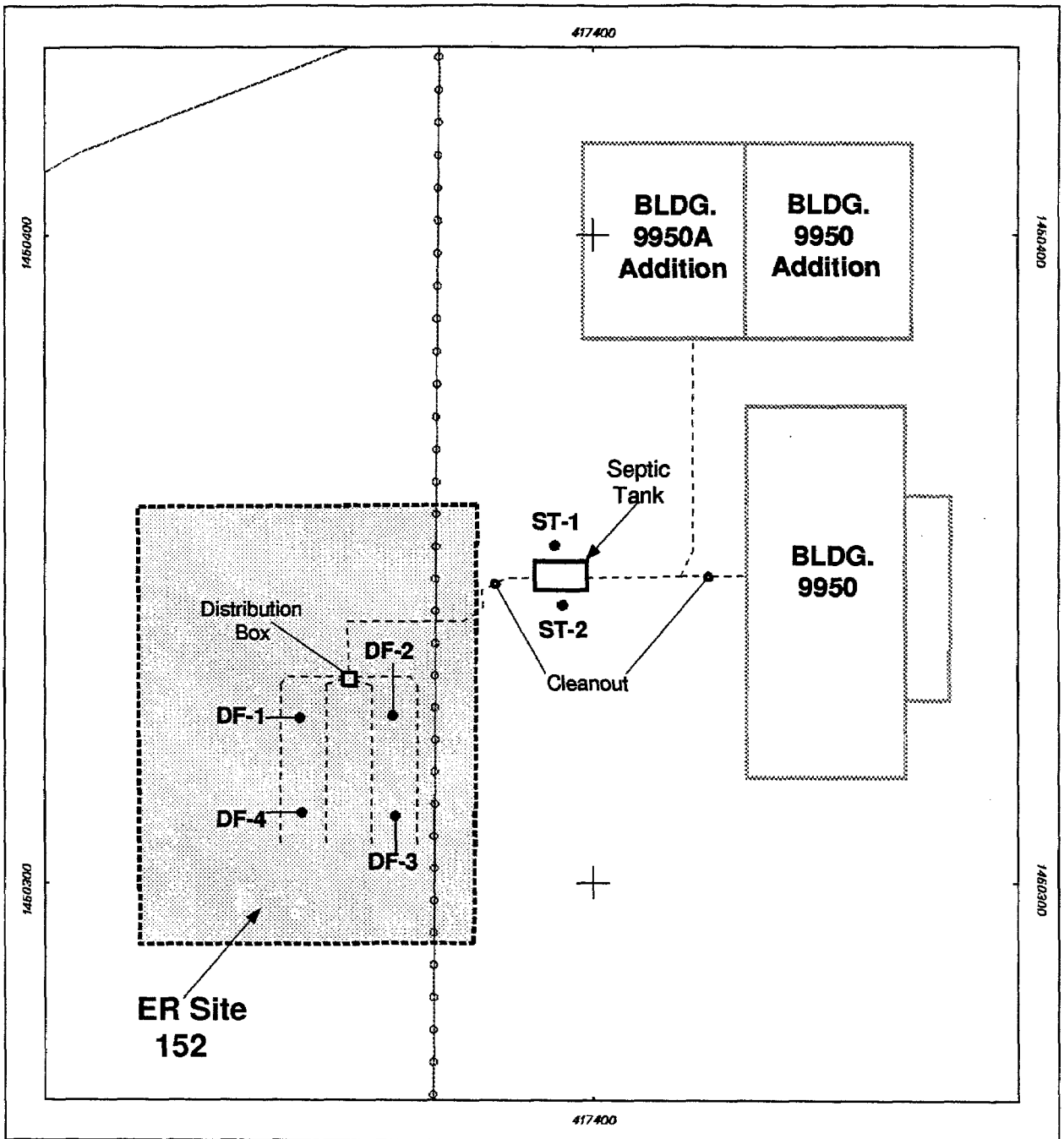
0 1200 2400
Scale in Meters

N

GIS

FIGURE 1-1
Location Map for Site 152
Sandia National Laboratories,
New Mexico

dahelfr SNL GIS ORG. 7512 08/20/96 MAPID=961158a



Legend

- Boring Location
- Fences
- KAFB Roads
- Buildings
- Sanitary Sewerline, Drainfield
- Septic Tank, Distribution Box, Cleanout
- ER Site 152

Sandia National Laboratories, New Mexico
Environmental Restoration Geographic Information System

Transverse Mercator Projection, New Mexico State Plane Coordinate System, Central Zone
1927 North American Horizontal Datum, 1929 North American Vertical Datum

DRAFT
Unclassified
1:600

0 12.5 25
Scale in Feet

0 3 6
Scale in Meters

FIGURE 1-2
Site Map for ER Site 152
Sandia National Laboratories,
New Mexico

dahelfr SNL GIS ORG. 7512 08/20/96 MAPID=961158

2.0 HISTORY OF THE SWMU

2.1 Sources of Supporting Information

In preparing the confirmatory sampling NFA proposal for ER Site 152, available background information was reviewed to quantify potential releases and to select analytes for the soil sampling.

Background information was collected from SNL/NM Facilities Engineering drawings and interviews with employees familiar with the site operational history. The following sources of information, hierarchically listed with respect to degree of importance, were used to evaluate ER Site 152:

- Confirmatory subsurface soil sampling conducted in November 1994, January 1995, and October 1995 (SNL/NM November 1994a, January 1995a, October 1995a and October 1995b);
- Two survey reports, including a geophysical survey (Lamb 1994), and a passive soil gas survey (NERI June 1995);
- Results of samples collected from the septic tank in 1992 (SNL/NM June 1993) and 1994 (SNL/NM May 1994);
- Approved RFI Work Plan and addenda for OU 1295, Septic Tanks and Drainfields (SNL/NM March 1993, November 1994b, December 1994, January 1995b, March 1995a, March 1995b, and May 1995; and EPA September 1994, January 1995, and March 1995);
- Photographs and field notes collected at the site by SNL/NM ER staff;
- SNL/NM Facilities Engineering building drawings (SNL/NM October 1965);
- SNL/NM Geographic Information System data; and
- The RCRA Facility Assessment (RFA) report (EPA April 1987).

2.2 Previous Audits, Inspections, and Findings

ER Site 152 was first listed as a potential release site in the RFA report to the EPA in 1987 (EPA April 1987). This report contained a generic statement about this and many other SNL/NM septic systems where sanitary and industrial wastes may have been discharged during past operations. This SWMU was included in the RFA report as Site 79, along with other septic and drain systems at SNL/NM. All the sites included in Site 79 are now designated by individual SWMU numbers.

2.3 Historical Operations

The following historical information has been excerpted from several sources, including SNL/NM March 1993, IT March 1994, and SNL/NM November 1994b.

Building 9950, the Materials Test Facility, was constructed in the early 1960s and used as an explosives test facility until 1969. Prior to 1969, Building 9950 conducted explosives testing using beryllium, cadmium, lead, mercury, nitroguanidine, Baratol, cyclo-trimethylene trinitramine (RDX), and cyclotetramethylene tetranitramine (HMX). It is not known whether explosive compounds were handled inside the building in preparing the tests or whether there was a potential for these constituents to be introduced to the septic system. The explosive testing was conducted at two locations 200 feet southwest of Building 9950 and on the roof of Building 9950. Any potential surface contamination from this testing is being investigated as part of the OU 1335 site characterization process for ER Site 109 (SNL/NM March 1996b).

The building contained a darkroom, and photographic chemicals were discharged in the sink prior to 1974. Alcohol, kerosene, acetone, and methyl ethyl ketone (MEK) were used to clean parts but were reportedly never discharged into the septic system. Polychlorinated biphenyl (PCB)-contaminated capacitors were removed from Building 9950 in 1978. No mention was made of any leaks or spills from the capacitors.

The original description of the septic system reported in the RFI indicated that the site included a septic tank, seepage pit, and a drainfield. Further investigation showed that only a septic tank and drainfield are present at this site.

The septic system is no longer active. Building 9950, as of 1993, is connected to an extension of the City of Albuquerque sanitary sewer system (SNL/NM July 1993).

3.0 EVALUATION OF RELEVANT EVIDENCE

3.1 Unit Characteristics

There are no safeguards inherent in the drain systems from Buildings 9950 or in facility operations that could have prevented past releases to the environment.

3.2 Operating Practices

As discussed in Section 2.3, effluent was released to the Building 9950 septic tank and drainfield when the septic system was active. Hazardous wastes were not managed or contained at ER Site 152.

3.3 Presence or Absence of Visual Evidence

No visible evidence of soil discoloration, staining, or odors indicating residual contamination was observed when: (1) the drainfield was located and partially excavated with the backhoe in August 1994 (SNL/NM August 1994), and (2) soil samples were collected in the drainfield and around the septic tank in November 1994, January 1995, and October 1995 (SNL/NM November 1994a, January 1995a, October 1995a and October 1995b).

3.4 Results of Previous Sampling/Surveys

Sludge and aqueous samples were collected from the ER Site 152 septic tank in July 1992. The aqueous sample was analyzed for volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), pesticides, PCBs, metals, selected radionuclide constituents, and several miscellaneous analytes. Three VOCs were identified (1,2-dichloroethene [total], trichloroethene [TCE], and methylene chloride), and one SVOC was identified (phenol). No pesticides or PCBs were detected. Several metals, phenolic compounds, oil and grease, and radionuclides were detected. The sludge sample was analyzed for metals, gross alpha/beta, and selected radionuclide constituents. Several metals and radionuclides were detected. The analytical results of these samples are presented in Appendix A.1.

A second round of septic tank sludge samples were collected in May 1994 (SNL/NM May 1994) for waste characterization purposes and were analyzed for VOCs, SVOCs, total and Toxicity Characteristic Leaching Procedure (TCLP) RCRA metals, beryllium, hexavalent chromium, phenolics, explosive compounds, isotopic uranium, and gamma spectroscopy radionuclides. One VOC was identified (TCE), and three SVOCs were identified (phenol, 4-methylphenol, and bis [2-ethylhexyl] phthalate). Concentrations of a number of metals were detected in the total metals analysis. However, in the TCLP RCRA metals analysis identified only barium. Hexavalent chromium was detected at a level below the reporting limit. Low levels of phenolics were identified. No explosive compounds were detected. Uranium isotopes were detected in the isotopic uranium analysis. The only radionuclide identified in the gamma spectroscopy analysis was potassium 40.

Septic tank liquid samples were also collected in May 1994 (SNL/NM May 1994) for waste characterization purposes. They were analyzed for VOCs, phenolics, explosive compounds, cyanide, RCRA metals, tritium, isotopic uranium, and gamma spectroscopy radionuclides. Three VOCs were identified (acetone, 1,2-dichloroethene, and TCE). No phenolics, explosive compounds, or cyanide were detected. Several RCRA metals were detected. Uranium isotopes were detected in the isotopic uranium analysis. Tritium was detected at an activity level of 870 picocuries per liter (pCi/L). No radionuclides were identified in the gamma spectroscopy analysis. The analytical results from the sampling of the septic tank in May 1994 are presented in Appendix A.2.

A geophysical survey using Geonics™ Model EM-31 and EM-38 ground conductivity meter was performed at the site in June 1994 to attempt to locate the drainfield. The technique was not successful in delineating the drainfield. A possible shallow plume of higher moisture content was identified west of the distribution box in an area that is mostly north and west of the drainlines in the drainfield (Lamb 1994, SNL/NM August 1994).

A passive soil-gas survey was conducted in the area of the drainfield in June and November 1994 using PETREX™ sampling tubes to identify any releases of VOCs and SVOCs that may have occurred from the drainfield (SNL/NM June 1994 and November 1994c). A PETREX™ soil-gas survey is a semiquantitative screening procedure that can be used to identify many volatile and semivolatile organic compounds. This technique may be used to guide VOC and SVOC site investigations. The advantages of this sampling methodology are that large areas can be surveyed at relatively low cost, the technique is highly sensitive to organic vapors, and the result produces a measure of soil vapor chemistry over a two- to three-week period rather than at one point in time. Each PETREX™ soil-gas sampler consists of two activated-charcoal coated wires housed in a reusable glass test tube container. At each sampling location, sample tubes are buried in an inverted position so that the mouth of the sampler is about 1 foot below grade. Samplers are left in place for a two- to three-week period, and are then removed from the ground and sent to the manufacturer, Northeast Research Institute (NERI), for analysis using thermal desorption-gas chromatography/mass spectrometry. The analytical laboratory reports all sample results in terms of "ion counts" instead of concentrations, and identifies those samples that contain compounds above the PETREX™ technique detection limits. In NERI's experience, levels below 100,000 ion counts for a single compound (such as perchloroethene [PCE] or TCE) and 200,000 ion counts for mixtures (such as benzene, toluene, ethyl benzene, and xylene [BTEX] or aliphatic compounds [C4-C11 cycloalkanes]), under normal site conditions, would not represent detectable levels by standard quantitative methods for soils and/or groundwater (NERI June 1995).

Eighteen PETREX™ tube samplers were placed, in two phases, in a grid pattern that covered the drainfield and septic tank area at this site (SNL/NM June 1994 and November 1994c). A map showing the tube sampling locations and the analytical results of the ER Site 152 passive soil gas survey is presented in Appendix A.3. No significant levels of PCE, BTEX, or aliphatic compounds were identified in the survey. However, the soil-gas survey identified potentially detectable levels of TCE at three locations (sample numbers 188, 191, and 595) in the drainfield. Two of the locations were near the north end of the drainfield, and the other location was in the southern part of the drainfield. Subsequent confirmatory soil samples that were

collected near these PETREX™ sample locations and analyzed for VOCs and SVOCs did not detect any of these constituents.

3.5 Assessment of Gaps in Information

The most recent material present in the septic tank was not necessarily representative of all discharges to the unit that occurred since it was put into service in the early 1960s. The analytical results of the various rounds of septic tank sampling were used, along with process knowledge and other available information, to help identify the most likely COCs that might be found in soils surrounding the septic tank and beneath the drainfield to select the types of analyses to be performed on soil samples collected from the site. While the history of past releases at the site is incomplete, analytical data from confirmatory soil samples collected in November 1994, January 1995, and October 1995 (discussed below) are sufficient to determine whether significant releases of COCs occurred at the site.

3.6 Confirmatory Sampling

Although the likelihood of significant releases of hazardous constituents at ER Site 152 was considered low, confirmatory soil sampling was conducted to determine whether COCs above background or action levels were released via the septic system at this site. A backhoe was used in August 1994 to determine the location, dimensions, and depth of the drainfield, which had no surface expression (SNL/NM August 1994). Once the drainfield was located, soil samples were collected from boreholes within the drainfield, and from either side of the septic tank (SNL/NM November 1994a, January 1995a, October 1995a, and October 1995b). There were significant difficulties in obtaining the deep interval soil samples at two locations in the drainfield. The Geoprobe™ met refusal at 5 to 11.5 feet in three tries at and near DF-3. No deep interval soil samples were collected at sample location DF-3. It also was not possible to obtain the deep interval soil sample from DF-4; the Geoprobe™ met refusal at 10 to 10.5 feet in two tries at and near the DF-4 location. In later sampling events in January 1995 and October 1995, using a larger Geoprobe™ unit, enough soil was collected from the deep interval at DF-4 for a PCB analysis and a radiological composite sample. Because of the difficulty in collecting samples at the 15-foot interval and because the samples collected in November 1994 did not identify COCs above detection limits or background concentrations in the drainfield, no other samples were collected at the deep interval at DF-4 for analysis. Additional efforts during these subsequent sampling events to collect samples from the deep interval at DF-3 were unsuccessful. With these two exceptions, the confirmatory soil sampling program was performed in accordance with the rationale and procedures described in the Septic Tank and Drainfields (ADS-1295) approved RFI Work Plan (SNL/NM March 1993) and addenda to the Work Plan developed during the OU 1295 project approval process (SNL/NM November 1994b and SNL/NM January 1995b). A summary of the types of samples, number of sample locations, sample depths, and analytical requirements for confirmatory soil samples collected at this site is presented in Table 3-1.

Confirmatory soil samples were collected from one boring on either side of the septic tank, and from four borings located in the middle and near the far ends of the two pairs of drainfield lateral lines. For septic tank borings, samples were collected from one interval in each borehole starting at the outside bottom of the tank, which was measured to be 9 feet below ground

Table 3-1
ER Site 152: Confirmatory Sampling Summary Table

Sampling Location	Parameters	Number of Borehole Locations	Top of Interval at Each Location	Total Number of Investigative Samples	Total Number of Duplicate Samples	Date(s) Samples Collected
Drainfield	VOCs	4	5', 15'	6*		11/1-2/94
	SVOCs	4	5', 15'	6*		"
	TNT screen	4	5', 15'	6*		"
	High explosives	4	5', 15'	6*		"
	RCRA metals + Be, Cr^{6+}	4	5', 15'	6*		"
	Gamma spec. composite	4	5', 15'	2		"
	Isotopic uranium composite	4	5', 15'	2		"
	Cyanide	4	5', 15'	6*		1/26/95
	PCBs	4	5',15'	7*	1	"
	Tritium composite	4	5', 15'	2		10/19/95
Septic tank	VOCs	2	9'	2	1	11/2/94
	SVOCs	2	9'	2	1	"
	TNT screen	2	9'	2	1	"
	High Explosives	2	9'	2	1	"
	RCRA metals + Be, Cr^{6+}	2	9'	2	1	"
	Cyanide	2	9'	2	1	"
	PCBs	2	9'	2		1/26/95
	Tritium composite	2	9'	1		10/16/95

Notes

* = deep interval soil samples could not be retrieved at location DF-3, not all samples could be retrieved at DF-4

Be = Beryllium

Cr^{6+} = Hexavalent chromium

PCBs = polychlorinated biphenyls

RCRA = Resource Conservation and Recovery Act

Spec. = Spectroscopy

SVOCs = Semivolatile organic compounds

TNT = Trinitrotoluene

VOCs = Volatile organic compounds

surface (bgs) at this site. For about half of the drainfield borings, samples were collected from two intervals in each borehole. The top of the shallow interval started at the bottom of the drain line trenches which were 5 feet bgs on average at this site, and the lower (deep) interval started at 10 feet below the top of the upper interval, or 15 feet bgs.

The Geoprobe™ sampling system was used to collect subsurface soil samples at this site. The upper photograph in Figure 3-1 shows the soil sampling operation in the drainfield. The Geoprobe™ sampling tool was fitted with a butyl acetate (BA) sampling sleeve and was then hydraulically driven to the top of the designated sampling depth. The sampling tool was opened and driven an additional 2 feet in order to fill the 2-foot long by approximately 1.25-inch diameter BA sleeve. The sampling tool and soil-filled sleeve were then retrieved from the borehole. In order to minimize the potential for loss of volatile compounds (if present), the soil to be analyzed for VOCs was not emptied from the BA sleeve into another sample container. The filled BA sleeve was removed from the sampling tool, and the top 7 inches were cut off. Both ends of the 7-inch section of filled sleeve were immediately capped with a Teflon membrane and rubber end cap, sealed with tape, and placed in an ice-filled cooler at the site. The soil in this section of sleeve was submitted for a VOC analysis. Soil from the remainder of the sleeve was then emptied into a decontaminated mixing bowl. Following this, additional 2-foot sampling runs were completed in order to recover enough soil to satisfy sample volume requirements for the interval. Soil recovered from these additional runs was also emptied into the mixing bowl and blended with soil from the first sampling run. The soil was then transferred from the bowl into sample containers using a decontaminated plastic spatula.

Drainfield and septic tank soil samples were analyzed for VOCs, SVOCs, cyanide, PCBs, high explosives, RCRA metals, beryllium, and hexavalent chromium by a commercial laboratory. Samples were shipped to the offsite commercial laboratories by an overnight delivery service. Samples were also screened for trinitrotoluene (TNT) at the SNL/NM field laboratory. Also, to determine if radionuclides were released from past activities at this site, composite samples were collected from the drainfield shallow and deep sampling intervals, and they were analyzed by a commercial laboratory for tritium and isotopic uranium, and were screened for other radionuclides using SNL/NM in-house gamma spectroscopy. Routine SNL/NM chain-of-custody and sample documentation procedures were employed for all samples collected at this site.

Quality assurance/quality control (QA/QC) samples collected during this effort consisted of one set of duplicate soil samples, a set of equipment blanks, and a trip blank. The duplicate soil samples included a sample from the shallow sampling interval in DF-1 (Figure 1-2) analyzed for PCBs and a set of duplicate soil samples from borehole ST-1 near the septic tank analyzed for VOCs, SVOCs, cyanide, explosive compounds, and TNT. No SVOCs, cyanide, PCBs, explosive compounds, or TNT were detected in any of the soil samples at ER Site 152. Trace levels of two VOCs, acetone and methylene chloride, were detected in the duplicate soil sample from the septic tank.

A set of aqueous equipment rinsate samples was collected following completion of the first soil sampling at the site; the samples were analyzed for VOCs, SVOCs, cyanide, RCRA metals, and beryllium. Trace levels of the common laboratory contaminants acetone and methylene

Collecting soil samples in the Building 9950 drainfield with the Geoprobe™, November 1, 1994. View looking south.

Building 9950 septic tank septage removal and cleaning operation, January 9, 1996. View looking northwest.

Figure 3-1. ER Site 152 Photographs

chloride were detected in the equipment blank, but no SVOCs or cyanide were identified. Trace levels of two metals (chromium and lead) were also identified in the metals equipment blank.

A trip blank was included with the set of soil samples shipped to the laboratory in November 1994; it was analyzed for VOCs only. Two common VOC laboratory contaminants were detected in the trip blank (acetone and methylene chloride). These common laboratory contaminants were either not detected, or were found in about the same concentration in the soil characterization samples. Soil used for the trip blanks was prepared by heating the material, and then transferring it immediately to the sample container. This heating process drives off any residual organic compounds (if present) and soil moisture that may be contained in the material. It is thought that when the soil trip blank container was opened at the laboratory, it immediately adsorbed both moisture and VOCs present in the laboratory atmosphere and therefore became slightly contaminated.

Summaries of all constituents detected by commercial laboratory analyses and the TNT screening measurements completed by the SNL/NM field laboratory for these confirmatory samples are presented in Tables 3-2, 3-3, and 3-4. Results of the SNL/NM in-house gamma spectroscopy composite soil sample screening for other radionuclides are presented in Appendices A.4 through A.5. Complete soil sample analytical data packages are archived in the SNL/NM Environmental Operations Records Center and are readily available for review and verification (SNL/NM November 1994d, January 1995c, and October 1995c).

3.7 Rationale for Pursuing a Confirmatory Sampling NFA Decision

As discussed in Section 3.4, the passive soil-gas survey identified some areas with VOC anomalies in the drainfield area, but subsequent soil sampling did not confirm the existence of detectable concentrations of these compounds in the soil.

Confirmatory soil sampling around the septic tank and in the drainfield did not identify any residual COCs indicating past discharges that could pose a threat to human health or the environment. As shown in Table 3-2, only below-reporting-limit concentrations of two VOC compounds (acetone and methylene chloride), which are common laboratory contaminants, were detected in soil samples collected from this site. SVOCs, cyanide, PCBs, explosive compounds, and TNT were not detected.

As shown in Table 3-3, septic tank and drainfield soil sample analytical results indicate that nine of the ten metals that were targeted in the Site 152 investigation were either (1) not detected, or (2) were detected in concentrations below the background UTL or 95th percentile concentrations presented in the SNL/NM study of naturally-occurring constituents (IT March 1996).

In one case the remaining metal, arsenic, exceeded the SNL/NM soil background UTL of 7 milligrams per kilogram (mg/kg). The deep interval sample from borehole DF-1 contained 7.9 mg/kg. Although this value exceeds the UTL, a risk analysis is not being completed for this analyte because the arsenic in this sample is considered to be naturally occurring. This statement is made for the following reasons: (1) There is no history of arsenic use at this site; (2) No arsenic was detected in the septic tank samples; (3) Although the concentration of

Table 3-2

ER Site 152
Summary of Organic and Other Constituents in Confirmatory Soil Samples
Collected Around the Septic Tank and in the Drainfield

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	VOCs Method 8240		SVOCs Method 8270	Cyanide Method 9010/9012	PCBs Method 8080	HE Method 8330	TNT Screen Colorimetric Method Based on EPA 8515	Units
						Acetone	Methylene Chloride						
Septic Tank Soil Samples:													
018162-1,2/018954-1	Soil	Field	11/2/94, 1/26/95	ST-1	9	ND	3.3 J	ND	ND	ND	ND	ND	ug/kg
018163-1	Soil	Dupl.	11/2/94	STD-1	9	9.6 J	2.5 J	ND	ND	NS	ND	ND	ug/kg
018164-1,2/018953-1	Soil	Field	11/2/94, 1/26/95	ST-2	9	4.5 J	2.3 J	ND	ND	ND	ND	ND	ug/kg
Drainfield Soil and QA Samples:													
018160-1,2/018948-1	Soil	Field	11/2/94	DF-1	5	7.6 J	3.7 J	ND	ND	ND	ND	ND	ug/kg
018949-1	Soil	Dupl.	1/26/95	DFD-1	5	NS	NS	NS	NS	ND	NS	NS	ug/kg
018161-1,2/018950-1	Soil	Field	11/2/94, 1/26/95	DF-1	15	ND	4 J	ND	ND	ND	ND	ND	ug/kg
018158-1,2/018946-1	Soil	Field	11/2/94, 1/26/95	DF-2	5	4.3 J	2.8 J	ND	ND	ND	ND	ND	ug/kg
018159-1,2/018947-1	Soil	Field	11/2/94, 1/26/95	DF-2	15	ND	3.3 J	ND	ND	ND	ND	ND	ug/kg
018155-1,2/018945-1	Soil	Field	11/2/94, 1/26/95	DF-3	5	8.7 J	3.2 J	ND	ND	ND	ND	ND	ug/kg
018157-1,2/018951-1	Soil	Field	11/2/94, 1/26/95	DF-4	5	ND	3 J	ND	ND	ND	ND	ND	ug/kg
018952-1	Soil	Field	1/26/95	DF-4	15	NS	NS	NS	NS	ND	NS	NS	ug/kg
018165-1,2,4	Water	EB	11/2/94	Site 152	NA	1.9 J	3 B,J	ND	ND	NS	NS	NS	ug/L
018154-1	Soil	TB	11/1/94	Site 152	NA	9.6 J	3.8 J	NS	NS	NS	NS	NS	ug/kg
Laboratory Detection Limit for Soil						10	5	330 or 1,600	500	33	250-2,200	1,000	ug/kg
Laboratory Detection Limit for Water						10	5	10-50	10	NA	NA	NA	ug/L
Proposed Subpart S Action Level For Soil						8E+06	9E+04	NA	2E+06	1E+03	NA	4E+04	ug/kg

Notes:

B = Compound detected in associated blank sample
Dupl. = Duplicate soil sample
EB = Equipment blank
fbgs = feet below ground surface
HE = High explosives
J = Result is detected below the reporting limit or is an estimated concentration.
NA = Not applicable
ND = Not detected
NS = No sample collected
PCBs = Polychlorinated biphenyls
QA = Quality assurance
SVOCs = Semivolatile organic compounds
TB = Trip blank
TNT = Trinitrotoluene
ug/kg = Micrograms per kilogram
ug/L = Micrograms per liter
VOCs = Volatile organic compounds

Table 3-3

ER Site 152
Summary of RCRA Metals, Beryllium, and Hexavalent Chromium in Confirmatory Soil Samples
Collected Around the Septic Tank and in the Drainfield

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	RCRA Metals, Methods 6010 and 7471								Other Metals Be-Method 6010 Cr^{6+}-Method 7196		Units
						As	Ba	Cd	Cr, total	Pb	Hg	Se	Ag	Be	Cr^{6+}	
Septic Tank Soil Samples:																
018162-2	Soil	Field	11/2/94	ST-1	9	3	63.9	ND	11.7	4.1 J	ND	ND	ND	0.24	ND	mg/kg
018164-2	Soil	Dupl.	11/2/94	STD-1	9	2.7	63.7	ND	9.5	ND	ND	ND	ND	0.3	ND	mg/kg
018163-2	Soil	Field	11/2/94	ST-2	9	3.2	113	ND	7.9	ND	ND	ND	ND	0.27	ND	mg/kg
Drainfield Soil and QA Samples:																
018160-2	Soil	Field	11/2/94	DF-1	5	3	88.4	ND	10.3	5.6 J	ND	ND	ND	0.44	ND	mg/kg
018161-2	Soil	Field	11/2/94	DF-1	15	7.9	60.7	ND	9.3	8	ND	ND	ND	0.39	ND	mg/kg
018158-2	Soil	Field	11/2/94	DF-2	5	2.7	75.5	ND	6.9	4.6 J	ND	ND	ND	0.26	ND	mg/kg
018159-2	Soil	Field	11/2/94	DF-2	15	3	60.6	ND	11.7	3.5 J	ND	ND	ND	0.21	ND	mg/kg
018155-2	Soil	Field	11/1/94	DF-3	5	3.2	56.9	ND	9.7	3.7 J	ND	ND	ND	0.33	ND	mg/kg
018157-2	Soil	Field	11/2/94	DF-4	5	2.1	80.8	ND	11	ND	ND	ND	ND	0.21	ND	mg/kg
018165-3	Water	EB	11/2/94	Site 152	NA	ND	ND	ND	0.01 J	0.0032	ND	ND	ND	ND	NS	mg/L
Laboratory Detection Limit For Soil						1	1	0.5	1	5	0.1	0.5	1	0.2	0.05	mg/kg
Laboratory Detection Limit for Water						0.01	0.01	0.005	0.01	0.003	0.0002	0.005	0.01	0.002	NA	mg/L
Number of SNL/NM Background Soil Sample Analyses *						15	727	1,740	647	536	1,724	2,134	2,302	887	393	NA
SNL/NM Soil Background Concentration Range *						2.1-7.9	0.5-495	0.0027-6.2	0.5-31.4	0.75-103	0.0001-0.68	0.037-17.2	0.0016-8.7	0.1 - 1.6	0.02-<2.5	mg/kg
SNL/NM Soil Background UTL or 95th Percentile Concentration*						7	214	0.9	15.9	11.8	<0.1	<1.0	<1.0	0.65	<2.5	mg/kg
Proposed Subpart S Action Level For Soil						0.50	6,000	80	80,000 **	400 ***	20	400	400	0.2	400 **	mg/kg

Table 3-3, concluded:

ER Site 152
Summary of RCRA Metals, Beryllium, and Hexavalent Chromium in Confirmatory Soil Samples
Collected Around the Septic Tank and in the Drainfield

Notes:

As = Arsenic. Arsenic background concentrations presented above are based on analyses of subsurface soil samples collected in the Coyote Test Field (CTF) area.

Ba = Barium. Barium background concentrations presented above are based on analyses of subsurface soil samples collected in the Southwest and CTF areas.

Be = Beryllium. Beryllium background concentrations presented above are based on analyses of surface and subsurface samples collected in the Southwest, CTF, and Offsite areas.

Cd = Cadmium. Cadmium background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.

Cr = Chromium. Chromium background concentrations presented above are based on analyses of subsurface soil samples collected in the Southwest area.

Cr^{6+} = Hexavalent chromium. Hexavalent chromium background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

Pb = Lead. Lead background concentrations presented above are based on analyses of subsurface samples collected in the Southwest and Offsite areas.

Hg = Mercury. Mercury background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.

Se = Selenium. Selenium background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the North, Tijeras, Southwest, CTF and Offsite areas.

Ag = Silver. Silver background concentrations presented above are based on analyses of subsurface soil samples collected in the North, Tijeras, Southwest, CTF, and Offsite areas.

Dupl. = Duplicate soil sample
EB = Equipment blank
fbgs = Feet below ground surface
J = Result is detected below the reporting limit or is an estimated concentration.
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
NA = Not applicable
ND = Not detected
NS = No sample
QA = Quality assurance
UTL = Upper Tolerance Limit
* IT March 1996
** 80,000 mg/kg is for Cr^{3+} only. For Cr^{6+}, proposed Subpart S action level is 400 mg/kg.
*** No proposed Subpart S action level for lead in soil; 400 ppm is EPA proposed action level (EPA July 1994)

Table 3-4

ER Site 152
Summary of Isotopic Uranium and Tritium in Confirmatory Soil Samples
Collected Around the Septic Tank and in the Drainfield

Sample Number	Sample Matrix	Sample Type	Sample Date	Sample Location (Figure 2)	Top of Sample Interval (fbgs)	Isotopic Uranium Method EPI A-011B for 1994 samples Method LAL-91-SOP-0108 for 1995 samples (pCi/g) U-233/ U-234 Result	U-233/ U-234 Error *	U-233/ U-234 M.D.A.	U-235 Result	U-235 Error *	U-235 M.D.A.	U-238 Result	U-238 Error *	U-238 M.D.A.	Tritium Method LAL-91-SOP-0066 (pCi/L) Result	Error *	M.D.A.
Septic Tank Soil Samples:																	
026162-1	Soil	Compos.	10/16/95	ST-1/2	9										ND	170	100
Drainfield Soil Samples:																	
023874-1	Soil	Compos.	11/2/94	DF-1/2/3/4	5	0.700	0.113	0.09	ND	0.023	0.09	0.544	0.095	0.09			
023875-1	Soil	Compos.	11/2/94	DF-1/2/4	15	0.474	0.137	0.09	ND	0.042	0.09	0.486	0.139	0.09			
026165-1	Soil	Compos.	10/19/95	DF-1/2/3/4	5										110	190	110
026166-1	Soil	Compos.	10/19/95	DF-1/2/4	15										ND	160	100
Number of SNL/NM Background Soil Sample Analyses **						14			283			90			U		
SNL/NM Soil Background Range **						0.44-<5.02			0.004-3			0.153-2.3			U		
SNL/NM Soil Background 95th Percentile **						<5.02			0.16			1.4			U		
Nationwide Tritium Range in Precipation and Drinking Water ***						NA			NA			NA			100-400		

Notes:

U-233 = Uranium 233

U-234 = Uranium 234. Uranium 233/234 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-235 = Uranium 235. Uranium 235 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

U-238 = Uranium 238. Uranium 235 background concentrations presented above are based on analyses of surface and subsurface soil samples collected in the Southwest area.

Compos. = Composite
fbgs = Feet below ground surface
M.D.A. = Minimum Detectable Activity
ND = Not detected
pCi/g = Picocuries per gram

pCi/L = Picocuries per liter
U = Undefined for SNL/NM soils
UTL = Upper Tolerance Limit
* Error = +- 2 sigma uncertainty
** IT March 1996
*** EPA October 1993

arsenic exceeds the UTL, it is within the range of background values (2.1 to 7.9 mg/kg) for the subsurface samples of the Coyote Test Field Area Group, which was used as the reference group for arsenic; and (4) This concentration also falls within the range of background values (0.033 to 17 mg/kg) reported in the Sandia background study for another group of subsurface samples from the North/Tijeras/Southwest/Offsite Area Group (IT March 1996).

As shown in Table 3-4, the results of the isotopic uranium analysis were all below the 95th percentile background activity levels. Tritium was not detected in soil moisture from the composite sample collected near the septic tank or in the composite sample collected from the drainfield deep interval (Table 3-4). Tritium was detected in soil moisture from the drainfield composite shallow sample at an activity level of 110 pCi/L. However, the detection occurred at the laboratory minimum detectable activity level with potential error greater than the reported value itself. Background tritium activity levels for SNL/NM soils were not reported in the IT background report (IT March 1996). The soil moisture contained in soil samples such as these represents either infiltrated precipitation or water discharged from Building 9950 to the drainfield. It is therefore appropriate to compare the tritium activity level detected in the sample soil moisture to naturally occurring tritium levels found in precipitation or drinking water samples. The tritium activity level of 110 pCi/L detected in the drainfield sample was therefore compared to and found to be within the naturally occurring tritium activity range of 100 to 300 pCi/L found in precipitation samples collected from locations throughout the U.S., and 100 to 400 pCi/L in drinking water samples collected from locations around the country (EPA October 1993). This comparison indicates that tritium is not present above natural background levels in soil moisture beneath the drainfield at this site.

The gamma spectroscopy semiqualitative screening of composite samples from the drainfield shallow and deep sampling intervals did not indicate any concentrations of other radionuclides in soils at this site that would indicate introduced contamination or contamination above background levels (Appendices A.4 and A.5).

Finally, the ER Site 152 septic tank contents were removed and the tank was cleaned in January 1996 (SNL/NM January 1996a). This activity is displayed in the lower photograph of Figure 3-1. The tank was then inspected by a representative of the New Mexico Environment Department (NMED) to verify that the tank contents had been removed and the tank closed in accordance with applicable State of New Mexico regulations (SNL/NM January 1996b).

4.0 CONCLUSION

Sample analytical results generated from this confirmatory sampling investigation have shown that detectable or significant concentrations of COCs are not present in soils at ER Site 152, and that additional investigations are unwarranted and unnecessary. Based on archival information and chemical and radiological analytical results of soil samples collected next to the septic tank and in the drainfield, SNL/NM has demonstrated that any contaminants present at this site pose an acceptable level of risk under current and projected future land use (Criterion 5 of Section 1.2). Therefore, ER Site 152 is recommended for an NFA determination.

Ecological risk has not been specifically addressed in this NFA. However, the RCRA metals, isotopic uranium, and tritium were either not detected or were detected in concentrations that were judged to be within SNL/NM or other background concentrations. Also, only trace levels of two VOCs were identified, and these levels are probably the result of laboratory contamination. This information suggests that there is an acceptable level of ecological risk at this site, and no further assessment of ecological risk is planned for ER Site 152.

5.0 REFERENCES

5.1 ER Site 152 References

Sandia National Laboratories/New Mexico (SNL/NM), October 1965, "SNL/NM Facilities Engineering Drawing Number 88182, Sheet 9 of 18," KAFB, Albuquerque, NM.

Sandia National Laboratories/New Mexico (SNL/NM), May 1994, Field Log #0080, Page 16, 5/19/94, Field notes for ER Site 152 second round septic tank sampling.

Sandia National Laboratories/New Mexico (SNL/NM), June 1994, Field Log #0080, Page 34, 6/14/94, and Field Log #0102, Pages 6, 11/16/94, Field notes for ER Site 152 passive soil gas survey.

Sandia National Laboratories/New Mexico (SNL/NM), August 1994, Field Log #0096, Pages 17-19, 8/31/94, Field notes for ER Site 152 drainfield location and partial excavation with the backhoe.

Sandia National Laboratories/New Mexico (SNL/NM), November 1994a, Field Log #0096, Pages 93-96, 11/1/94 and 11/2/94, Field notes for ER Site 152 septic tank and drainfield soil sampling.

Sandia National Laboratories/New Mexico (SNL/NM), November 1994c, Field Log #0102, Page 6, 11/16/94, Field notes for ER Site 152 passive soil gas survey.

Sandia National Laboratories/New Mexico (SNL/NM), November 1994d, Environmental Operations Records Center, Record Number ER/1295-152/DAT, Chain of Custodies 1291, 3576, and 3581, Analytical reports for ER Site 152 septic tank and drainfield soil that was sampled in November 1994.

Sandia National Laboratories/New Mexico (SNL/NM), January 1995a, Field Log #0102, Pages 33-35, 1/25/95 and 1/26/95, Field notes for collecting soil samples for PCB analyses from the ER Site 152 septic tank and drainfield.

Sandia National Laboratories/New Mexico (SNL/NM), January 1995c, Environmental Operations Records Center, Record Number ER/1295-152/DAT, Chain of Custody 2578, Analytical reports for ER Site 152 septic tank and drainfield soil sampled for PCB analyses in January 1995.

Sandia National Laboratories/New Mexico (SNL/NM), October 1995a, Field Log #0102, Page 91, 10/16/95, Field notes for collecting soil samples for a tritium analysis from the ER Site 152 septic tank.

Sandia National Laboratories/New Mexico (SNL/NM), October 1995b, Field Log #0102, Pages 94-95, 10/18/95 and 10/19/95, Field notes for collecting soil samples for tritium analyses from the ER Site 152 drainfield.

Sandia National Laboratories/New Mexico (SNL/NM), October 1995c, Environmental Operations Records Center, Record Number ER/1295-152/DAT, Chain of Custody 04398, Analytical reports for ER Site 152 septic tank and drainfield soil sampled for tritium analysis in October 1995.

Sandia National Laboratories/New Mexico (SNL/NM), January 1996a, Field Log #0147, Pages 131-135, 1/9/96, Field notes for the ER Site 152 septic tank septage removal and cleaning operation.

Sandia National Laboratories/New Mexico (SNL/NM), January 1996b, Field Log #0147, Pages 189 and 191, 1/26/96, Field notes for the NMED empty tank verification inspection for the ER Site 152 septic tank.

5.2 Other References

Department of Energy (DOE), Albuquerque Operations Office, Environmental Safety and Health Division, Environmental Program Branch, September 1987, draft "Comprehensive Environmental Assessment and Response Program (CEARP) Phase 1: Installation Assessment, Sandia National Laboratories, Albuquerque," Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

IT Corporation (IT), March 1994, "Sampling and Analysis Plan for Shallow Subsurface Soil Sampling, RCRA Facility Investigation of Septic Tanks and Drainfields (OU 1295)," IT Corporation, Albuquerque, New Mexico.

IT Corporation (IT), March 1996, "Background Concentrations of Constituents of Concern to the Sandia National Laboratories/New Mexico Environmental Restoration Project and the Kirtland Air Force Base Installation Restoration Program," IT Corporation, Albuquerque, New Mexico.

Lamb Associates, Inc. (Lamb), 1994, "Geophysical Surveys at 23 Sites, Septic Tanks and Drainfields, ADS #1295," Lamb Associates, Inc., Albuquerque, NM.

New Mexico Environment Department (NMED), November 1995, "Environmental Restoration Document of Understanding," Santa Fe, New Mexico.

Northeast Research Institute (NERI), June 1995, "PETREX™ Soil Gas Survey Results Conducted at Various Sites of the Septic Tanks and Drainfields Operating Units, Sandia National Laboratories," Albuquerque, New Mexico, Northeast Research Institute, Lakewood, Colorado.

Sandia National Laboratories/New Mexico (SNL/NM), March 1993, "Septic Tanks and Drainfields (ADS-1295) RCRA Facility Investigation Work Plan," Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), June 1993, "Sandia National Laboratories/New Mexico Septic Tank Monitoring Report, 1992 Report," Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), July 1993, Internal memorandum from Joe Jones to Bob Galloway, "Tech Area 3 and CTF Septic Tanks," July 26, 1993, Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), November 1994b, "Comment Responses to USEPA Notice of Deficiency November 1994," Sandia National Laboratories, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), December 1994, memo (via fax) from EPA to SNL/NM titled "Sandia National Laboratories, Septic Tanks and Drainfields RFI Workplan, December 1994." Memo addresses additional technical issues and questions regarding the SNL/NM November 1994 NOD response document.

Sandia National Laboratories/New Mexico (SNL/NM), January 1995b, "SNL/DOE Response to EPA Issue Paper, Septic Tanks and Drainfields RFI Work Plan, January 26, 1995," memo from SNL/NM (Bob Galloway) to EPA responding to technical issues and questions posed by the EPA in the January 9, 1995 "Issue Paper." Memo conveyed to EPA by DOE/KAO (John Gould) on February 13, 1995.

Sandia National Laboratories/New Mexico (SNL/NM), February 1995, "Program Implementation Plan for Albuquerque Potential Release Sites," Sandia National Laboratories Environmental Restoration Program, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1995a, Letter with attachments dated March 14, 1995 from SNL/NM (Mike Sanders) to EPA (Nancy Morlock (via fax) clarifying the number of samples and types of analyses used to characterize the OU 1295 ER sites.

Sandia National Laboratories/New Mexico (SNL/NM), March 1995b, Letter dated March 17, 1995 from SNL/NM (Bob Galloway) to Nancy Morlock (EPA) describing proposed procedures for additional soil sampling at OU 1295 ER Sites 49 and 144.

Sandia National Laboratories/New Mexico (SNL/NM), May 1995, Letter with attachments dated May 11, 1995 from SNL/NM (Bob Galloway) to EPA (Nancy Morlock) describing number of and spacing between boreholes used to characterize each of the OU 1295 drainfields in late 1994 and early 1995. Maps showing borehole locations in each OU 1295 drainfield were also included with the transmittal.

Sandia National Laboratories/New Mexico (SNL/NM), March 1996a, "Site-Wide Hydrogeologic Characterization Project, Calendar Year 1995 Annual Report," Sandia National Laboratories Environmental Restoration Project, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), March 1996b, "The RFI (RCRA Facility Investigation Work Plan) for OU 1335 Southwest Test Area," Sandia National Laboratories Environmental Restoration Project, Albuquerque, New Mexico.

Sandia National Laboratories/New Mexico (SNL/NM), August 1996, SNL ER Sites, "Well Locations at Kirtland Air Force Base," SNL Geographic Information System Map # 961160, August 21, 1996.

U.S. Environmental Protection Agency (EPA), April 1987, "Final RCRA Facility Assessment Report of Solid Waste Management Units at Sandia National Laboratories, Albuquerque, New Mexico," Contract No. 68-01-7038, EPA Region VI.

U.S. Environmental Protection Agency (EPA), December 1987, "Hazardous Waste; Codification Rule for 1984 RCRA Amendments; Final Rule," *Federal Register*, Vol. 52, Title 40, Parts 144, 264, 265, 270, and 27, Environmental Protection Agency, Washington, D.C.

U.S. Environmental Protection Agency (EPA), July 1990, "Corrective Action for Solid Waste Management Units (SWMU) at Hazardous Waste Management Facilities, Proposed Rule," *Federal Register*, Vol. 55, No. 145, Title 40, Parts 264, 265, 270, and 271, July 27, 1990.

U.S. Environmental Protection Agency (EPA), August 1992, "Hazardous Waste Management Facility Permit No. NM5890110518," EPA Region VI, issued to Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), August 1993, "Module IV of RCRA Permit No. NM 5890110518," EPA Region VI, issued to Sandia National Laboratories, Albuquerque, New Mexico.

U.S. Environmental Protection Agency (EPA), October 1993, "Environmental Radiation Data Report 73, January-March 1993", Report Number EPA 402-R-93-092, National Air and Radiation Environmental Laboratory, Montgomery, Alabama.

U.S. Environmental Protection Agency (EPA), July 1994, "Guidance on Residential Lead-Based Paint, Lead-Contaminated Dust, and Lead-Contaminated Soil," Memorandum from Lynn R. Goldman, M.D., USEPA Assistant Administrator to EPA Regional Directors.

U.S. Environmental Protection Agency (EPA), September 1994, "Notice of Deficiency, Sandia National Laboratories, Septic Tanks and Drainfields RFI Work Plan," Letter dated September 15, 1994 from EPA (William Honker) to DOE/AO (Kathleen A. Carlson).

U.S. Environmental Protection Agency (EPA), January 1995, "Issue Paper, Septic Tanks and Drainfields RFI Work Plan," memo (via fax) dated January 9, 1995 from EPA (Nancy Morlock) to DOE/KAO posing additional technical questions about information presented in the SNL/NM November 1994 Notice of Deficiency (NOD) response document.

U.S. Environmental Protection Agency (EPA), March 1995, Letter dated March 31, 1995 from EPA (Allyn M. Davis) to DOE/AL (Kathleen A. Carlson) approving the March 1993 OU 1295 RFI Work Plan and follow-up addenda, and specifying a few additional conditions and requirements.

Appendix A

OU 1295, Site 152
Results of Previous Sampling and Surveys

Appendix A.1

ER Site 152
Summary of Constituents in the 1992 Septic Tank Samples

Appendix A.1

ER Site 152
Summary of Constituents in the 1992 Septic Tank Samples

Building 9950
Coyote Test Field
Sample ID No. SNLA008432
Tank ID No. AD89044R

On July 21, 1992, aqueous and sludge samples were collected from the inactive septic tank serving Building 9950. Analytical results of concern are noted below.

- Trichloroethene (TCE) was detected in the aqueous sample at a level of 0.180 mg/L, which exceeds the New Mexico Water Quality Control Commission discharge limit (NMDL) of 0.1 mg/L, the City of Albuquerque (COA) discharge limit of 5.0 mg/L, and the Resource Conservation and Recovery Act (RCRA) toxicity characteristic (TC) limit of 0.5 mg/L.

- Methylene chloride was detected in the aqueous sample at a level of 0.18 mg/L, which exceeds the NMDL of 0.1 mg/L.

- Phenol was detected in the aqueous sample at a level of 0.011 mg/L, and total phenolic compounds were detected in the aqueous sample at a level of 0.15 mg/L. These values exceed NMDLs of 0.005 mg/L for each.

- Chromium was detected in the aqueous sample at a level of 0.13 mg/L, which exceeds the NMDL of 0.05 mg/L.

- Silver was detected in the aqueous sample at a level of 0.37 mg/L, which exceeds the NMDL of 0.05 mg/L.

No other parameters were detected in the aqueous fractions above NMDLs, COA discharge limits, or RCRA TC limits that identify hazardous waste.

During review of the radiological data, no parameters were detected that exceed U.S. Department of Energy derived concentration guideline limits or the investigation levels established during this investigation.

ER Site 152
Summary of Constituents in the 1992 Septic Tank Samples

Results of Septic Tank Analyses
(LIQUID SAMPLES)

Building No./Area:	9950 CTF
Tank ID No.:	AD89044R
Date Sampled:	7/21/92
Sample ID No.:	SNLA-008432

Analytical Parameter	Measured Concentration	State Discharge Limit	COA Discharge Limit	Comments
Volatile Organics (EPA 624)	(mg/l)	(mg/l)	(mg/l)	
1,2-Dichloroethene (total)	0.21	NR	NR	
Methylene Chloride	0.18	0.1	(TTO=5.0)	Exceeds State Limit
Trichloroethene	12	0.1	(TTO=5.0)	Exceeds State and COA Limits: Exceeds RCRA TC limit of 0.5 mg/L
Semivolatile Organics (EPA 625)	(mg/l)	(mg/l)	(mg/l)	
Phenol	0.011	0.005	(TTO=5.0)	Exceeds State Limit
Pesticides (EPA 608)	(mg/l)	(mg/l)	(mg/l)	
None detected above laboratory		NR	(TTO=5.0)	
reporting limits.				
PCBs (EPA 608)	(mg/l)	(mg/l)	(mg/l)	
None detected above laboratory		0.001	(TTO=5.0)	
reporting limits.				
Metals	(mg/l)	(mg/l)	(mg/l)	
Arsenic	ND (0.0050)	0.1	2.0	
Barium	0.055	1.0	20.0	
Cadmium	0.001	0.01	2.8	
Chromium	0.13	0.05	20.0	Exceeds State Limit
Copper	0.1	1.0	16.5	
Lead	0.024	0.05	3.2	
Manganese	0.066	0.20	20.0	
Mercury	0.00049	0.002	0.1	
Nickel	—	NR	12.0	Not analyzed
Selenium	ND (.02)	0.05	2.0	
Silver	0.37	0.05	5.0	Exceeds State Limit
Thallium	ND (0.025)	NR	NR	
Zinc	0.35	10.0	28.0	
Uranium	ND (0.007)	5.0	NR	
Miscellaneous Analytes	(mg/l)	(mg/l)	(mg/l)	
Phenolic Compounds	0.15	0.005	4.0	Exceeds State Limit
Nitrates/Nitrites	ND (0.10)	10.0	NR	
Formaldehyde	ND (0.50)	NR	260.0	
Fluoride	ND (0.10)	1.6	180.0	
Cyanide	ND (0.01)	0.2	8.0	
Oil and Grease	23.7	NR	150.0	
Radiological Analyses	(pCi/l)	(pCi/l)	(pCi/l)	
Radium 226	0.4 +/- 0.2	30.0	NR	
Radium 228	0 +/- 3	30.0	NR	
Gross Alpha	0 +/- 20	NR	NR	
Gross Beta	100 +/- 40	NR	NR	
Tritium	-30 +/- 606	NR	NR	

NR = Not Regulated; ND(#.#) = Not Detected (Reporting Limit); TC = Toxicity Characteristic of Hazardous Waste

Note: City and State Discharge Limits are for comparison purposes only. City limits apply to discharge of sanitary effluent and not septic tank waste, state limits apply to effluent discharged onto or below the surface of the ground.

References - City of Albuquerque NM Sewer Use and Wastewater Control Ordinance (1990), Section 8-8-3, and New Mexico Water Quality Control Commision Regulations (1988), Section 3-100.

ER Site 152
Summary of Constituents in the 1992 Septic Tank Samples

Results of Septic Tank Analyses (Sludge Sample)			
Building No./Area:	**9950 CTF**		
Tank ID No.:	**AD89044R**		
Date Sampled:	**7/21/92**		
Sample ID No.:	**SNLA008432**		
Analytical Parameter	**Measured Concentration**	**± 2 Sigma Uncertainty**	**Units**
Water Content	88.0	NA	%
Arsenic	ND (0.50)	NA	mg/kg
Barium	33.4	NA	mg/kg
Cadmium	3.0	NA	mg/kg
Chromium	32.8	NA	mg/kg
Copper	88.1	NA	mg/kg
Lead	31.8	NA	mg/kg
Manganese	11.5	NA	mg/kg
Mercury	0.20	NA	mg/kg
Nickel	---	NA	mg/kg
Selenium	ND (1.0)	NA	mg/kg
Silver	161	NA	mg/kg
Thallium	ND (0.50)	NA	mg/kg
Zinc	203	NA	mg/kg
Gross Alpha	39	17	pCi/g
Gross Beta	26	17	pCi/g
Gross Alpha	24	14	pCi/g
Gross Beta	33	22	pCi/g
Gross Alpha	9	11	pCi/g
Gross Beta	38	22	pCi/g
Gross Alpha	34	17	pCi/g
Gross Beta	49	27	pCi/g
Tritium	-30	606	pCi/L
Bismuth-214	<0.0242 (<13.8)	NA	pCi/mL
Cesium-137	0.00714 (<5.41)	0.00261	pCi/mL
Potassium-40	0.556 (<154)	0.0659	pCi/mL
Lead-212	0.0168 (<15.2)	0.00413	pCi/mL
Lead-214	0.00324 (<16.4)	0.00628	pCi/mL
Radium-226	0.1203 (<134)	0.0546	pCi/mL
Thorium-234	<0.167 (<78.8)	NA	pCi/mL
Thallium-208	0.00667 (<8.26)	0.00258	pCi/mL

ND = Not Detected
NA = Not Applicable

Note: Values in parenthesis are measurements reported by Enseco/RMAL in pCi/g (wet weight).

Appendix A.2

ER Site 152
Summary of Constituents in the 1994 Septic Tank Samples

Appendix A.2

ER Site 152
Summary of Constituents in 1994 Septic Tank Samples

Sample Number	Sample Matrix	Sample Type	Sample Date	Method	Compound Name	Result	Detection Limit or M.D.A.	+- 2 Sigma Uncertainty	Units
Sludge Septage Samples:									
015468-7	Sludge	Field	5/19/94	8240 (VOCs)	Trichloroethene	2,200	120	NA	mg/kg
015468-10	Sludge	Field	5/19/94	8270 (SVOCs)	Phenol	1.4 J	3.3	NA	mg/kg
				8270 (SVOCs)	4-Methylphenol	26	3.3	NA	mg/kg
				8270 (SVOCs)	bis(2-Ethylhexyl) phthalate	5.8	3.3	NA	mg/kg
015468-9	Sludge	Field	5/19/94	TCLP/6010	Arsenic	ND	0.1	NA	mg/L
				TCLP/6010	Barium	0.3 B	0.01	NA	mg/L
				TCLP/6010	Cadmium	ND	0.005	NA	mg/L
				TCLP/6010	Chromium	ND	0.01	NA	mg/L
				TCLP/6010	Lead	ND	0.05	NA	mg/L
				TCLP/7470	Mercury	ND	0.0004	NA	mg/L
				TCLP/6010	Selenium	ND	0.2	NA	mg/L
				TCLP/6010	Silver	ND	0.01	NA	mg/L
015468-8	Sludge	Field	5/19/94	6010	Arsenic	ND	10	NA	mg/kg
				6010	Barium	8.3	1	NA	mg/kg
				6010	Beryllium	ND	0.2	NA	mg/kg
				6010	Cadmium	1.1	0.5	NA	mg/kg
				6010	Chromium	4.6	1	NA	mg/kg
				6010	Lead	19.6	5	NA	mg/kg
				7470	Mercury	0.24	0.1	NA	mg/kg
				6010	Selenium	ND	0.5	NA	mg/kg
				6010	Silver	51.3	1	NA	mg/kg
015468-11	Sludge	Field	5/19/94	7196	Chromium (VI)	0.010 J	0.025	NA	mg/kg
015468-9	Sludge	Field	5/19/94	HPLC	14 explosive compounds	ND	0.25 - 2.2	NA	ug/g
015468-8				9010/9012	Cyanide	ND	0.5	NA	mg/kg
015468-8	Sludge	Field	5/19/94	9065	Phenolics	9.2	1	NA	mg/kg
015468-14	Sludge	Field	5/19/94	HASL-300	Uranium 238	2.9	0.023	0.35	pCi/g
				HASL-300	Uranium 235	0.12	0.031	0.046	pCi/g
				HASL-300	Uranium 233/234	6.6	0.023	0.7	pCi/g
015468-16	Sludge	Field	5/19/94	Gamma Spec.	Potassium 40	1.04	NR	0.271	pCi/g

Appendix A.2, concluded:

ER Site 152
Summary of Constituents in 1994 Septic Tank Samples

Sample Number	Sample Matrix	Sample Type	Sample Date	Method	Compound Name	Result	Detection Limit or M.D.A.	+- 2 Sigma Uncertainty	Units
Liquid Septage Samples:									
015468-1	Liquid	Field	5/19/94	8240 (VOCs)	Acetone	14 BJ	20	NA	ug/L
				8240 (VOCs)	1,2-Dichloroethene	9.5 J	10	NA	ug/L
				8240 (VOCs)	Trichloroethene	250	10	NA	ug/L
015468-2	Liquid	Field	5/19/94	9065	Phenolics	ND	0.01	NA	mg/L
015468-3	Liquid	Field	5/19/94	HPLC	14 Explosive Compounds	ND	0.02 - 0.84	NA	ug/L
015468-4	Liquid	Field	5/19/94	9012	Cyanide	ND	0.01	NA	mg/L
015468-6	Liquid	Field	5/19/94	6010	Arsenic	ND	0.01	NA	mg/L
				6010	Barium	0.064	0.01	NA	mg/L
				6010	Cadmium	0.005	0.005	NA	mg/L
				6010	Chromium	0.024	0.01	NA	mg/L
				6010	Lead	0.0043 B	0.003	NA	mg/L
				6010	Selenium	ND	0.005	NA	mg/L
				6010	Silver	0.012	0.01	NA	mg/L
015468-5	Liquid	Field	5/19/94	7470	Mercury	ND	0.0002	NA	mg/L
015468-12	Liquid	Field	5/19/94	EPA H-01	Tritium	870	250	170	pCi/L
015468-13	Liquid	Field	5/19/94	HASL-300	Uranium 238	0.42	0.031	0.14	pCi/L
				HASL-300	Uranium 235	ND	0.031	0.022	pCi/L
				HASL-300	Uranium 233/234	0.61	0.069	0.18	pCi/L
015468-15	Liquid	Field	5/19/94	Gamma Spec.	73 radionuclides	NV	0.008-21.6	NR	pCi/L

Notes

B = Compound detected in the laboratory blank.
HPLC = High performance liquid chromatography
J = Result is detected below the reporting limit or is an estimated concentration.
M.D.A. = Minimum Detectable Activity
mg/kg = Milligrams per kilogram
mg/L = Milligrams per liter
NA = Not Applicable
ND = Not detected
NR = Not reported by laboratory
NV = No values reported (results were ND, short half-life, or not significant)
pCi/g = Picocuries per gram
pCi/L = Picocuries per liter
Spec. = Spectroscopy
SVOCs = Semivolatile organic compounds
TCLP = Toxicity Characteristic Leaching Procedure
ug/g = micrograms per gram
ug/L = micrograms per liter
VOCs = Volatile organic compounds

Appendix A.3

ER Site 152
Summary of 1994 PETREX™ Passive Soil-Gas Survey Results

Appendix A.3

ER Site 152
Summary of 1994 PETREX™ Passive Soil-Gas Survey Results

Table 15
PETREX Relative Soil Gas Response Values
(in ion counts)
STD SITE 152

	Sample	PCE	TCE	BTEX	Aliphatics
Phase I Sampling	185	ND	7485	2103	900
	186	ND	ND	16899	6539
	187	ND	78672	6880	5705
	188	ND	199377	18010	41033
	189	ND	9860	8986	899
	190	ND	ND	6586	41131
	191	ND	106385	3223	9774
	192	ND	55249	8980	27726
	193	ND	ND	4493	933
	194	ND	ND	13865	18058
	195	2316	ND	10180	35933
	D-1190	ND	ND	ND	21473
	* 900	ND	ND	4553	6219
	* 901	ND	ND	4732	ND
Phase II Sampling	589	ND	ND	3,301	ND
	590	ND	ND	3,159	2,093
	591	ND	ND	4,458	4,309
	592	ND	30,639	21,930	47,242
	593	ND	ND	15,402	63,353
	594	ND	5,903	24,624	17,919
	595	ND	146,291	15,462	17,616
	* 900	ND	ND	ND	ND
	* 901	ND	ND	ND	ND

PCE - Tetrachloroethene
Indicator Mass Peak(s) 164

TCE - Trichloroethene
Indicator Mass Peak(s) 130

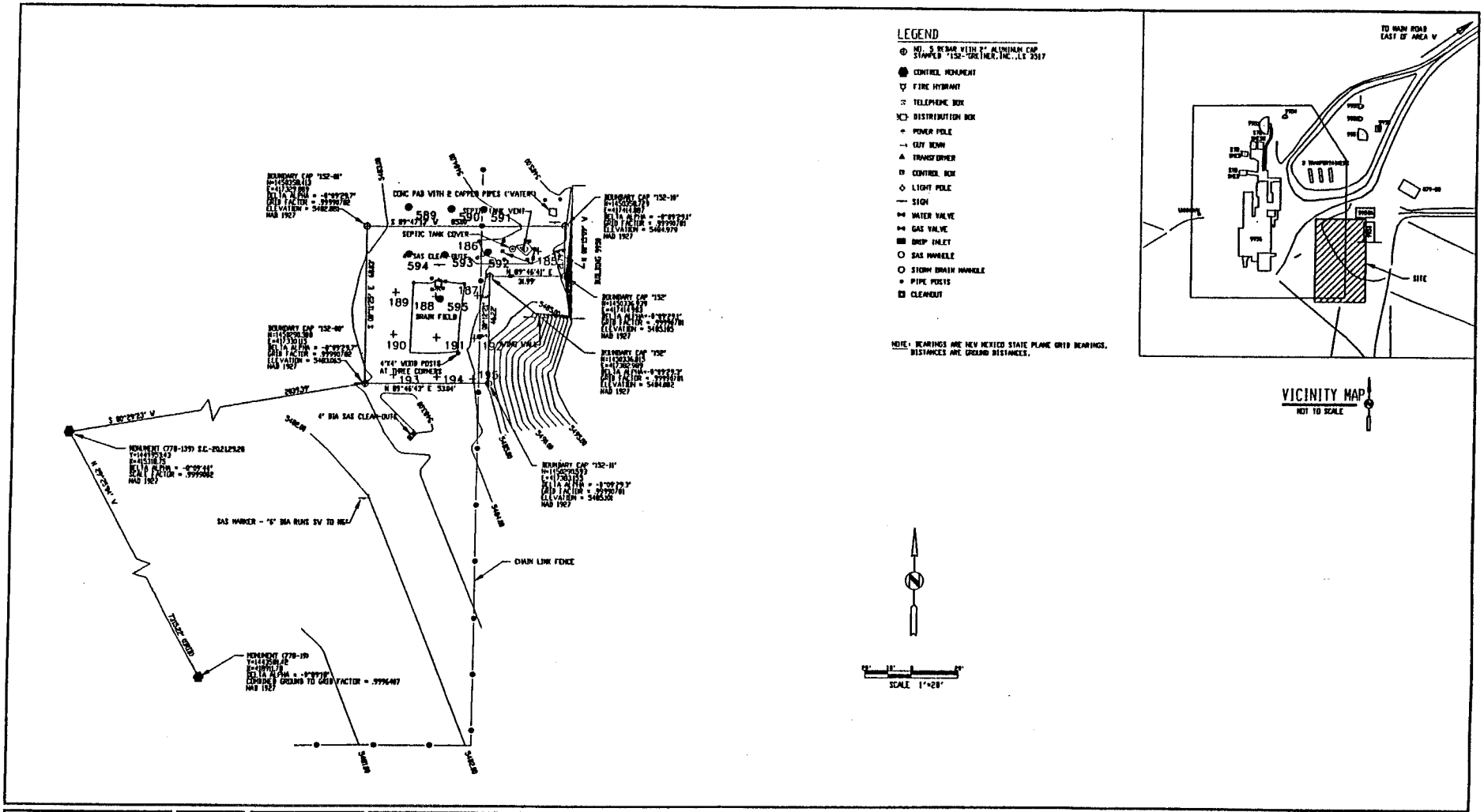
BTEX - Benzene, Toluene, Ethylbenzene/Xylene(s)
Indicator Mass Peak(s) 78, 92, 106

Aliphatics - C4-C11 Cycloalkanes/Alkenes
Indicator Mass Peak(s) 56, 70, 84, 98, 112, 126, 140, 154

D - Duplicate Sample
Sample numbers in thousands duplicate of sample numbers in hundreds

* QA/QC Blank Sample - No Compounds Detected above the PETREX Normal reporting Limits

ER Site 152
Summary of 1994 PETREX™ Passive Soil-Gas Survey Results



NERI Northeast Research Institute LLC 805 Parfet Street Suite 100 Lakewood, Colorado 80215 (303) 238-0090	Drawn By: JCS Checked By: Project Manager: JOG	Project #: 2096-152 Date: 5/23/1995 File Name: 152_1.dwg	Sandia National Laboratories STD Site 152 Albuquerque, New Mexico PETREX FINGERPRINT TECHNOLOGY®	LEGEND Features: + PETREX Sample Location (PHASE I) ● PETREX Sample Location (PHASE II)	Sample Locations Plate 11

October 13, 2003

ADDITIONAL /SUPPORTING DATA

CAN BE VIEWED AT THE
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AND SECURITY (ES&H and Security)
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